

# STAT 216 Introduction to Statistics Fall 2016

**Course Coordinators :**

	Office	Phone	e-mail - BEST WAY TO REACH US!
Jon Graham	Math 204	243-2561	jgraham@mso.umt.edu
Cindy Leary	Math 214	243-6712	cindy.leary@mso.umt.edu

**Stat 216 on Moodle:** All information for this course will be posted on Moodle. Here you will find all handouts given in class and all notes covered during lecture. This includes all lab worksheets, “hand-in” homework assignments, and the solutions to all assignments. The lecture notes have significant amounts of material intentionally omitted so that we may cover this material during class. If you miss a class, check Moodle for any announcements made that day, and copy the notes from a classmate. We will not provide you with copies of notes you missed. A course pack containing the blank notes is available in the bookstore.

**Course Format:** 3 lectures/week: MWF 9:00-9:50 or 10:00-10:50am, North Underground Lecture Hall (NULH 101).  
 1 discussion/lab section per week: Thursday at the times listed below.  
 Attendance at discussion sections is mandatory.

**Prerequisite:** M 115 (Probability and Linear Mathematics, previously labeled MATH 117)

### STAT 216 Discussion Sections

9:00 lecture				10:00 lecture			
Section	Time	Room	Instructor	Section	Time	Room	Instructor
1	8:00	MA211	Brian Tenneson	11	8:00	MA103	Ellie Bayat-Mokhtari
2	9:00	MA211	Jessie Hurd	12	9:00	MA103	Ellie Bayat-Mokhtari
3	10:00	MA211	Jessie Hurd	13	10:00	MA103	JonAlan Osborne
4	11:00	MA211	Brian Tenneson	14	11:00	MA103	JonAlan Osborne
5	12:00	MA211	Joyce Schlieter	15	12:00	MA103	Ted Owen
6	1:00	MA211	Joyce Schlieter	16	1:00	MA103	Ted Owen
7	2:00	MA211	Daniel Barthelmeh	17	2:00	MA103	Mike O’Lear
8	3:00	MA211	Daniel Barthelmeh	18	3:00	MA103	Mike O’Lear

**STAT 216 Instructors:** You may go to ANY of the instructors for help during their office hours (please see Moodle for up-to-date hours):

Name	Office	Email
Jon Graham	Math 204	jgraham@mso.umt.edu
Cindy Leary	Math 214	cindy.leary@mso.umt.edu
Daniel Barthelmeh	Corbin 256	daniel.barthelmeh@umontana.edu
Ellie Bayat-Mokhtari	Corbin 369	elham.bayatmokhtari@umontana.edu
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JonAlan Osborne	Corbin 356	jonalan.osborne@umontana.edu
Ted Owen	Corbin 354	theodore.owen@umontana.edu
Mike O’Lear	Math 212	m.olear@mso.umt.edu
Kevin Palencia-Infante	Corbin 361	kevin.palencia-infante@umontana.edu
Joyce Schlieter	Corbin 266	joyce.schlieter@umontana.edu
Brian Tenneson	Corbin 256	brian.tenneson@umontana.edu

## Learning Outcomes

Upon successful completion of STAT 216, a student will:

1. be able to describe and explore sets of data both numerically and graphically.
2. know how to use the normal model for the distribution of a single variable and the linear regression model for the relationship between two variables.
3. know the basic principles of good experimental design and good sampling design.
4. know the fundamental ideas of statistical inference for means and proportions including both hypothesis testing and confidence intervals.
5. be able to interpret confidence intervals and P-values in the context of real problems.
6. be a critical consumer of statistical studies reported in the media.

**Computing Information:** StatCrunch statistical software will be used by the instructor during class and will also be required for some homework problems throughout the course. This software can be accessed within MyStatLab. Instructions for using StatCrunch are given at the end of the chapters within the course notes when applicable.

**Learning Catalytics:** Learning Catalytics is a cloud based learning and assessment system that we will use during the lecture portion of this course. It is available within MyStatLab, but in order to access it, you will need to have a device that can connect to the wireless internet in the lecture hall. A device such as a smartphone, tablet, or laptop would work well. This technology allows me to assess your understanding of the material, make the course more engaging, and collect data for our class to analyze. Your responses will also constitute a portion of your grade (5%). Your Learning Catalytics grade will be partially based on attendance and partially based on correct responses. While these responses are worth 5% of your grade, you also have the option of using your overall exam average as your Learning Catalytics grade.

**Textbook:** Intro Stats (4th ed. Custom), by DeVeaux, Velleman, & Bock. You automatically have access to the online textbook and resources through Moodle (unless you choose to “opt out” of the tuition billing system). If you would additionally like to purchase a printed copy of the book (for \$20), please go to <http://www.mypearsonstore.com/stores/STAT216> to order one. You will also need the **username: pearson** and **password: welcome**.

**Calculators:** Since Math 115 is a pre-requisite for this course, it is expected that you already own a calculator suitable for this class and that you also know how to use it. Your calculator should, among other things, be able to calculate probabilities from the Normal and t-distributions. All in class demonstrations will be done with a TI-83, TI-83 Plus, or TI-84 Plus. If you need to purchase a calculator, you would probably be most comfortable with one of the TI's just listed. A list of other calculators is provided on the Moodle course page. Please note that calculators with a QWERTY keyboard, smart watches, and cell phones are not allowed for use during exams.

**Incomplete (I) Grades:** Incompletes (I's) are given at the discretion of the course coordinators (Jon Graham & Cindy Leary) only. See the 2015-2016 UM catalog for the conditions under which an "I" may be given.

**Credit/No-Credit Grades:** A D- grade is required to receive credit under the Credit/No-Credit option. You will be allowed to change your grading option from Credit/No Credit to Traditional or vice versa up until May 6th. **Note: A course taken to meet a general education requirement (such as Stat 216) CANNOT be taken as Credit/No Credit.** See the 2015-2016 UM catalog for more information.

**Grading:** Your overall percentage for the course will be computed using the weights to the right. I will also drop some of your lowest scores as indicated in the table. The +/- grading system will be used to assign final grades. There is no strict grading scale for this course; however, the table below indicates the worst-case scenario for the letter grade breakdown. For example, if you earn an 80% in the course, you are guaranteed no worse than a B-, and it could be higher. No extra credit will be available.

Grade Category	Weight	# Dropped
MyStatLab Homework	10%	2
Hand-in Homework	8%	1
Learning Catalytics (or Exam Avg)	5%	5 Days
Worksheet/Lab Grade	8%	1
Exam #1	23%	0
Exam #2	23%	0
Exam #3	23%	0

Grade	A- to A+	B- to B+	C- to C+	D- to D+	F	CR (Credit)
Percentage	90-100%	80-89%	68-79%	57-67%	Less than 57%	57-100%

**“Hand-in” Homework:** Weekly assignments will be posted on Moodle as a word document. It is expected that you **type** the answers into this document or **neatly** write in your work when appropriate. This course largely focuses on teaching you how to interpret and analyze data. We expect you to use **correct grammar and spelling** while providing **clear and concise** explanations. These assignments will be handed in at the **beginning** of your lab on Thursdays. **LATE HOMEWORK WILL NOT BE ACCEPTED FOR ANY REASON.** We will not regularly accept homework assignments via e-mail, but you may e-mail an assignment if you are sick and cannot make it to campus. Homework is not only a fairly substantial portion of your grade, but it is vital to your success in this class. Working with other students on homework is allowed and encouraged, as long as you **hand in your own work**, and do not simply copy someone else’s work. Solutions to all problems from each assignment will be posted on Moodle.

**Online Homework:** You will access your online homework problems and other textbook resources through Moodle (MyStatLab). To initially gain access to this system, use the informational document posted at the top of our Moodle page. Once you go through this initial login procedure, you will automatically have access to MyStatLab resources for the rest of the semester. Any online assignments completed after the due date will only receive 50% of the total points earned.

**Recommended Problems:** Additional recommended problems will be assigned but not collected from each chapter, with answers provided in the textbook. You are **STRONGLY** encouraged to work all of these problems. Solutions to homework and worksheets will also be posted on Moodle.

**Labs/Worksheets:** During the discussion sections, you will have the opportunity to ask questions about course material and work on problems with other students in small groups. You will complete a worksheet most weeks during the discussion section. The intent of the worksheets is to have you practice using statistical methods and to promote cooperative learning. Completing the worksheets in groups will allow you to discuss ideas and problems with other students. Your worksheet grade will reflect both your own work and the work of your group. **\*\*\* Make-up worksheets will not be given for any reason.**

	Test	Date	Time
<b>Tests:</b> There will be 2 <b>evening</b> tests during the semester given in NULH and Urey lecture halls.	Test #1	Thursday, October 6th	6:00-7:30pm
	Test #2	Thursday, November 3rd	6:00-7:30pm

You **must** take the test in your assigned location and time. More will be said about the exams at a later date. If you cannot make it to an exam, you must let us know **BEFORE** the exam is given. No make-up exams will be given without a documentable reason for missing the exam.

**Final exam:** The final exam will emphasize later material but will also cover some of the key elements from earlier chapters. The final exam date and time will be announced during lecture in early September. We are currently trying to find an alternative date for this exam (other than the date it is scheduled). Please do not currently plan to leave town any earlier than the time & date published in the final exam schedule. Makeup exams will not be given due to travel plans.

**Study Advice:** COME TO CLASS! STUDY THE NOTES! BE AN ACTIVE LEARNER! Read through the notes to be covered **before** coming to class and review them after class. Either print the notes from Moodle or purchase a course pack from the bookstore. This will reduce the volume of notes you will need to take in class and you will get more out of the lecture. Read the textbook to solidify your understanding of the topics introduced during lecture. Doing your homework as well as the additional recommended problems **conscientiously** will greatly increase your chance of success in this class. There will be **STUDY JAM** sessions held most Monday and Wednesday evenings in the U.C. commons (6:30pm-9:00pm). **\*\*Plan to spend 2 hours outside of class for each hour of class\*\***

**Adding/Dropping the Course:** September 19 is the deadline for students to drop or change a grading option via CyberBear. After this date, a student is allowed to make changes **only by petition**. I will sign petitions to change your grading option to credit/no credit up until December 12, but I will not sign a drop slip after the **October 31 deadline** unless there are extenuating circumstances. The final deadline for any and all changes is December 12th. These policies are listed in the UM catalog at <http://www.umt.edu/catalog>.

**Students with disabilities:** Students with disabilities may request reasonable modifications by contacting Jon Graham or Cindy Leary. The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). “Reasonable” means the University permits no fundamental alterations of academic standards or retroactive modifications. For more information, please consult <http://www.umt.edu/disability>.

**Academic Misconduct:** All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. This includes, but is not limited to, copying answers on homework assignments, cheating on exams, and any type of dishonesty in your work.

All students need to be familiar with the Student Conduct Code. The Code is available for review online at [http://www.umt.edu/vpsa/policies/student\\_conduct.php](http://www.umt.edu/vpsa/policies/student_conduct.php).

Date	Day	Chapter	Topics Covered (Tentative!!)
8/29	Monday	1	Course Introduction, Data
8/31	Wednesday	1,2	Categorical Data, StatCrunch demo
9/2	Friday	2	Categorical Data Displays & Distributions
9/5	Monday		Labor Day
9/7	Wednesday	3	Displaying & Describing Quantitative Variables
9/9	Friday	3	More Displaying & Describing Quantitative Variables
9/12	Monday	3	Mean and Standard Deviation
9/14	Wednesday	4	Comparing Distributions, Boxplots
9/16	Friday	4	Comparing Distributions
9/19	Monday	5	z-scores
9/21	Wednesday	5	Normal Model and the Empirical Rule
9/23	Friday	5,6	More on Normal Models, Scatterplots
9/26	Monday	6	Correlation
9/28	Wednesday	7	Linear Regression, Residual Analysis, & $R^2$
9/30	Friday	8	Regression Wisdom: Outliers, Influential Points
10/3	Monday	8	Transformations in Regression
10/5	Wednesday	7,8	Regression Examples
10/6	Thursday		<b>EXAM from 6:00pm to 7:30pm</b>
10/10	Monday	9	Randomness & Simulation
10/12	Wednesday	10	Sample Surveys, Simple Random Samples
10/14	Friday	10	Other Sampling Designs
10/17	Monday	11	Observational Studies, Experimental Designs
10/19	Wednesday	11	More on Experimental Designs
10/21	Friday	12	Randomness & Probability, Law of Large Numbers
10/24	Monday	15 (Skip 13,14)	Sampling Distribution of $\hat{p}$
10/26	Wednesday	15	Central Limit Theorem (CLT) for $\hat{p}$
10/28	Friday	16	Confidence interval for $p$
10/31	Monday	16	Confidence interval for $p$
11/2	Wednesday	17	Hypothesis testing introduction
11/3	Thursday		<b>EXAM from 6:00pm to 7:30pm</b>
11/7	Monday	17	Hypothesis Testing for p
11/9	Wednesday	17	Hypothesis Testing for p, P-values
11/11	Friday		Veterans Day
11/14	Monday	15	Central Limit Theorem (CLT) for $\bar{y}$
11/16	Wednesday	18	Inferences about means, t-procedures
11/18	Friday	18	Inferences about means, t-procedures
11/21	Monday	19	More about tests & P-values
11/23	Wednesday		Thanksgiving Break
11/25	Friday		Thanksgiving Break
11/28	Monday	19	Practical vs Statistical Significance, Type I & Type II Errors
11/30	Wednesday	20	Comparing two proportions
12/2	Friday	20	Comparing two proportions
12/5	Monday	20	Comparing two means
12/7	Wednesday	15-20	Summary of Inference procedures
12/9	Friday	15-20	Summary of Inference procedures
12/12	Monday		More examples & Special topics Final Exam Date - TBD